

KNOWLEDGE MANAGEMENT IN ACQUISITION AND PROGRAM MANAGEMENT (KM IN THE AM AND PM)

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Knowledge Management (KM) applies management principles to the knowledge life cycle (cradle to grave). Both Acquisition and Program Management (AM and PM) utilize some KM principles (e.g., lessons learned) for some time, but there are additional KM opportunities available to improve efficiency, effectiveness, and customer satisfaction.

There are Knowledge Management (KM) applications with potentially major payoffs to Acquisition Management (AM) and Program Management (PM). After defining KM, I will describe its major aspects and implementation and make specific recommendations for KM use in AM and PM.

DEFINITIONS

KM is the conscious creation, storage, distribution, and use of knowledge — management of knowledge. Knowledge is at a higher level of abstraction (LOA) than data or information. Data are the nuts and bolts; information is the structured arrangement of data; knowledge is the processed

information in context — understandable and actionable. The captain of a ship under attack cannot use piles of data or information (drawings with numerous intersecting lines, status reports, or even attacker LAT/LONG). A captain needs succinct, appropriate LOA, and actionable knowledge — target direction and range usable by ship's weapons systems — to decide whether or when to fire. Decisions depend upon knowledge, but decisions require understanding, wisdom, and the ability to integrate inputs from diverse sources. Nevertheless, a knowledge base (KB) can provide benchmarks of other captains' past actions and their results, and Case-Based Reasoning can automate the lessons-learned process.

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KM METHODS AND PAYOFFS

KM has two main aspects: social and technical. The social aspect comprises about two-thirds of KM. People tend to emphasize the aspect with which they are more familiar. Interaction among KM techniques provides major synergistic gains, while implementing either a technical or social approach in isolation provides limited Return on Investment (ROI) (value added). People share knowledge; it's natural. Much of KM is natural, but Information Technology (IT) enables great potential KM gains. KM adds purpose, organization, consciousness, and recognition. Institutional acceptance of KM's value facilitates its effectiveness.

SOCIAL ASPECTS OF KM

Communities of Practice (CoPs) assist practitioners, in a domain, to share knowledge, information, and data (KID) and develop cooperation and mutual support.

"KM adds purpose, organization, consciousness, and recognition."

For instance, the KM CoP is a CoP addressing KM. CoPs focus on one specific discipline or practice. Naval Facilities Engineering Command (NAVFAC) has numerous CoPs. Technical Discipline Leaders (TDLs) each have their own CoP within separate domains, but they share domain expertise in an enterprise-level CoP cutting across NAVFAC's endeavors. These CoPs are not collocated, but reside throughout the United States and other NAVFAC facilities. There are numerous CoPs throughout the

U.S. Government (USG) and industry including: Defense Acquisition University/ Assistant Secretary of the Navy (DAU/ASN) (AR)'s Program Manager's CoP, Navy's KM CoP, General Services Administration/Department of the Navy Chief Information Officer's (GSA/DON CIO's) Federal KM Working Group, and IBM's Institute for Knowledge Management.

Social Network Analysis (SNA) maps interactions between people within an organization. Such interactions are not homogeneous: specific persons act as Connectors, Salesmen, and Mavens whose value is hidden from view (Gladwell, 2000). Eliminating such functions/persons yields great institutional losses. During downsizing, such functions must be identified and contingencies created.

Recognition of generalized reciprocity can lead to a re-orientation of organizational values, culture, and definition of work. The top Ford Motor Company General Manager evaluated his direct subordinates' performance by the quality and quantity of their helping each other and eliminated subordinates who didn't actively help peers. His direct reports were the candidates of choice for new Ford General Managers.

Steve Denning introduced KM at the World Bank using storytelling as a change management technique, now recognized as a powerful way for organizations to codify norms, energize personnel, and achieve corporate cohesion (Peters & Waterman, 1982). Archetypal stories of founders' exploits establish company myths and culture. Storytelling codifies organizational KM and enables and facilitates KM changes.

DON CIO's annual knowledge fair provides a venue for knowledge workers to

share efforts throughout the USG. It provides one-stop shopping for initiatives, tools, techniques, and concepts relating to successful or unsuccessful KM implementation (i.e., KM of KM or meta-KM). The essence of KM is to reuse lessons-learned. However, KM is not limited to problem solving or best practices but can provide opportunities to break new ground. “Pygmies placed on the shoulders of giants see more than the giants themselves” (Lucan, 1968, p. 134).

TECHNICAL ASPECTS OF KM

Web portals are frequently used to connect knowledge workers (e.g., CoPs). KM supportive Web sites include threaded discussions orchestrated by CoP leaders (DON CIO, 2001). They also include sharing software — facilitating the discussing, sharing, and mutually devising of solutions, resolutions, and pilot programs with members at different physical locations. Certain video teleconferencing systems (with attached computers and software) allow users to simultaneously share or revise software programs at different locales.

Tacit Knowledge Transfer (TNT) is the capture, storage, distribution, and reuse of tacit knowledge. Explicit knowledge, usually recorded, is easily exploited. Tacit knowledge, living in people’s minds, is difficult to tap. Often, people have difficulty accessing or articulating their tacit knowledge unless a circumstantial stimulus triggers it. Someone who learned Cardio-Pulmonary Resuscitation (CPR) decades ago might be unable to describe it, but may be able to perform it when needed. Recalling tacit knowledge may

not need the incident of a heart attack to elicit it — but an interviewer may need Barbara Walters’ skill to obtain information during an interview. SPAWAR Systems Center Charleston successfully used such interviews for their TNT initiative.

Knowledge Bases/Banks (KBs) parallel data and information counterparts. Multimedia (video segments, presentations, Internet hyperlinks) add versatility to KBs, making them feasible and utilitarian. Today’s virtual libraries (KBs) are physically distributed but centrally accessed via Internet portals and provide user-friendly one-stop shopping. The Integrated Business Support System is being developed to implement this for Navy procurement — including a KB of processes as well as information—as is the DON CIO’s Data Management and Interoperability Repository, an Internet accessible portal that seamlessly connects databases at various Navy locations.

Case-Based Reasoning Tools have been utilized by Port Hueneme to reduce the number of service trips to repair or maintain equipment (Aha, 1992). They emulate Built In Test Equipment and help create

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documents based upon similar predecessor documents. They employ questions and answers to users in selecting best paragraphs or sections for documents. The Navy International Programs Office fielded International Agreements Generator to help author first drafts of new international agreements. Its paragraphs were approved by Office of the Secretary of Defense (OSD); none of its paragraphs in the final

draft can be challenged. Only tailored or negotiated changes can be challenged during OSD review.

Content analysis tools promise to greatly reduce workload by condensing documents into user-friendly, less time-consuming forms. Present author training to construct documents with higher knowledge densities (knowledge: information ratios) must be effectively automated to facilitate reader assimilation and reduce latency. Comprehensive search tools must be evolved.

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Most long-term training programs¹ utilize these and developmental/rotational assignments to provide participants with varied experi-

ences and perspectives. Electronic media (video teleconferencing, group sharing, Web sites, e-mail) facilitate such efforts through virtual mentoring. Push (versus pull) techniques² can expand recipients' involvement, as observers (for training) or active participants (for self-development). Participation is often a prerequisite for buy-in. Keeping stakeholders "in the loop" helps maintain their support. Virtual techniques do not replace physical contact, but can augment less frequent physical meetings. Virtual Reality capabilities (now under development) add dimensions to tacit transfer methods.

IMPLEMENTATION METHODS AND PROCESSES

While knowledge sharing and distribution are, in truth, a normal part of doing business, KM institutionalizes it. Change management (Prichett, 1993) can facilitate KM acceptance within an organization, especially using "springboard stories," (Denning, 2001) illustrative of how KM has enhanced the achievement or support of the organizational mission. The best stories are idiosyncratic of the audience and inspire buy-in/action versus intellectual agreement. Analysis and fancy slides only support such stories — not vice versa.

Many KM tools and techniques can improve operations (e.g., decision making) and facilitate goal achievement (e.g., on-the-job-training) in various organizations or situations. Activities analyze needs, choose a pilot project or objective, and apply KM tools and techniques most appropriate within the organizational culture. There must be a good fit between the approach, the organization, and the pilot project. Some such approaches, tools, and techniques are described below.

DON CIO provides KM Assists/Consults to requesting USN & USMC Commands. Assist/Consult Teams help Commands implement various KM initiatives via pilot projects supporting the requesting Command's vision, mission, objectives, and values. Teams/Commands select, design, and orchestrate KM initiatives and pilot projects that catalyze further KM initiatives. Efforts are also facilitated by KM CoP membership and participation. Sub-CoPs can be created locally for activities co-located with others (e.g.,

Washington Navy Yard) making it easier to share efforts and develop cross-pollination, mutual assistance, transportable learning, and insight.

KM Assist Teams use the *Knowledge Centric Organization Toolkit Compact Disk (KCO CD)* as their primary implementation tool. It includes documents, methods, procedures, processes, etc., for implementing a KM program. *Sharing e-Government Successes/Compendium of KM and eBusiness Initiatives* (documents eBusiness/Knowledge Fairs and initiatives), *Information Literacy* (helps users to find information), *IT Workforce Competencies* (IT functional job descriptions), *Systems Thinking* (strategic views and approaches) (Senge, 1990), and *Communities of Practice* (insights into creation, implementation, use, and value of CoPs) are also distributed by DON CIO.

KM works well under a Balanced Scorecard regimen. Since KM improves communications (knowledge sharing is key), it helps balance the many factors affecting decisions and organizational posture by providing a more concise and complete picture of the enterprise and the major factors affecting it. By empowering individual contributions, KM can improve commitment and efficient use of limited resources. Per Activation Theory (Duffy, 1962; Leuba, 1955), individual productivity has an optimal stimulation point — input quantity, relating quality to quantity. Lessons learned, best practices, and knowledge sharing can improve quality by decreasing or eliminating unnecessary input quantity. Participants reallocate time and effort more optimally across a spectrum of concerns and possibilities.

NAVY MARINE CORPS INTRANET (NMCI) APPLICATIONS

KM approaches provide numerous possibilities for potential NMCI applications to create a Knowledge Centric Organization DON. Synergistic outcomes can improve DON effectiveness and efficiency to create empowerment and more horizontal organization. NMCI provides consistent system capability baselines and interoperable IT across DON. It encourages wider use of more-limited, enterprise-oriented application sets. Present competition for human talent and the DoD “brain drain”³ indicate improved human/intellectual capital may soon become DoD’s paramount issue. Military Departments (MILDEPs) must minimize their fielded applications, integrate them to be mutually supportive, and (thus) reduce training requirements. Training a million employees is not affordable. Regarding KM itself, people

and technology must become mutually supportive and responsive to environmental trends. Changes in people (intellectual capital) and new technology must become mutually supporting.

Chosen applications should be usable throughout DON and DoD and enable autonomous use by employees to accomplish increasingly wider-variety tasks requiring extensive and widespread knowledge based on rapidly changing KID. Such IT solutions must support

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intellectual capital oriented/social capital-intensive knowledge processes. Technology should support psychological and sociological processes to create positive organizational outcomes. Outcomes (unlike outputs) are results that affect organizational interactions with outside (versus internal) individuals and organizations.

"Acquisition Reforms...have changed the face of government procurement."

The Learning Organization approach implies an Open Systems perspective as exemplified in a KCO — that

maintains its agility and timeliness through knowledge and learning (Senge, 1990).

The sections below describe how KM can benefit DoD acquisition and program management, with specific suggestions and recommendations on selection and implementation of KM tools, techniques, and approaches.

ACQUISITION MANAGEMENT (AM)

AM includes the acquisition of a variety of items or services, some of which come under the purview of Program Management (PM). Thus, PM (expounded/required by DoD 5000) is a subset of AM. Acquisition Reforms such as DoD credit cards for low value purchases, electronic malls, demise of military standards, use of commercial-off-the-shelf (COTS) items, and Government-Wide Acquisition Contract (GWAC) implementation have changed the face of government procurement.

The Integrated Business Support System (IBSS), formerly Integrated Contracting System, is completing its pilot effort. IBSS

is a multi-service effort to provide a one-stop AM shopping system via a single Web portal. It uses existing applications with new application software and provides middleware (invisible to the user) to connect these applications (e.g., Procurement Request Generator) to their Web site. A single log-on provides access to all the applications. IBSS provides contracting officers (and authorized buyers) the ability to create a wide variety of contract actions. It has uses for both AM and PM, providing opportunity to collect the right information and help create usable knowledge about specific efforts and how to generate them. It can take advantage of other IT developments such as Web Malls.

This expands potential KM leveraging. While the Defense Acquisition Workforce Improvement Act (DAWIA) established a contracting track, Systems Commands (SYSCOMs), for instance, have many different procedures, approaches, operating procedures, etc. that could be shared to provide a wider variety of solutions and alternatives. A Contracting Officer's (KOs) or procurement CoP⁴ with a Web site for sharing contracting knowledge could leverage existing knowledge. Considering the aging DoD workforce,⁵ capturing the tacit and explicit knowledge of seasoned Contracting Officers, for example, could save considerable time and money. Acquisition Category I programs, managed in PEOs (Program Executive Offices) supported by SYSCOMs (under operating agreements), are usually awarded by SYSCOM KOs and funded through SYSCOM comptrollers, while their Budget/Financial Managers and PMs remain in PEOs. Integrated Product Teams (IPTs) traverse functional boundaries to support individual programs. Similarly, a unified,

consistent, accessible system with select CoPs could simplify communications, standardize program responses to outside parties (e.g., program and resource sponsors), and expeditiously provide a depth of expertise not presently available. Such KM initiatives could help provide more seamless operations and support between Program Executive Officers (PEOs) and SYSCOMs. They can be extended to legal, logistics, and other support. While social and informal networks already exist, official recognition and technical support tools (group share, Web portals) can optimize⁶ valuable connectivity.

Each functional area can also create a Knowledge Network (KNet) similar to the Technical Discipline Leaders in the Navy Facilities Engineering Command. Such a network, backed up by Subject Matter Experts (SMEs), provides coverage during absences (e.g., travel or vacations), a multivariate bank of expert human resources (human capital), and a method to access this living Knowledge Bank (KB). Knowledgeable people can be contacted by phone, e-mail, etc. Microsoft created such a network that included a set of knowledge specialties or sub-specialties in which workers are qualified at several levels of competence (with supervisor concurrence) to also serve as a template for future training and job assignments (Davenport & Pruzak, 2000).

If DoD personnel, similar to Harvard graduates received permanent e-mail addresses, it would eliminate continual revision of knowledge maps and network tools (Cho, Jerrell & Landay, 2000). Important SME functional knowledge can be captured in writing or videotape and placed on the network in KBs for training and reuse. Intern programs⁷ can use such

KBs, both living and recorded, and CoPs/KNets can help resource shadowing and mentoring of interns, trainees, and workers seeking advancement or cross training. Furthermore, Artificial Intelligence (AI) tools can improve document creation and problem solving by incorporating best practices or results of past efforts, providing easier generation of better products. Rather than basing a new approach on the last workable one (often done now), the new one could be constructed from many past efforts, capitalizing on the advantages of each. A document tailored from sections of past documents may be superior to any individual whole document. The nature of synergy is for the product to exceed

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the sum of the parts (per systems engineering, optimizing the whole de-optimizes the parts, and optimizing the parts de-optimizes the whole⁸), and these tools can be synergistic with, for instance, a CoP/KNet Web site. Such arrangements help overcome implementation resistances such as knowledge hoarding ("knowledge is power" proponents) — a continuing anachronism in light of acquisition reform, teaming, enterprise planning/implementation, and customer/outcome orientation.

PROGRAM MANAGEMENT (PM)

KM has great potential to alleviate some of the difficulties created by the drastic environmental changes experienced by PM in the last decade. It can enable PMs

to build upon their strengths (e.g., systems engineering) while leveraging environmental changes (e.g., Acquisition Reform) in a judo-like manner — using another's momentum to carry one forward. Marrying PM with environmental changes seems like integrating something old, something new, something borrowed, and something blue — but can pay off for PMs, and the enterprise, if one can avoid the Not Invented Here syndrome. As Bob Turner

"PMs constantly consider and balance multiple concerns and influences important to program success."

said, "a stove-pipe on its side is a tunnel."⁹ It can connect an organization's parts so they can learn from each other. Re-engineering has sensitized

people to the importance of process architectures in the smooth functioning of complex organizations (Bennet, 2001). Since PMs are intimately involved in systems architectures, they have the necessary background to improve process architectures transversing hierarchical organizational boundaries. Per Elliot Jaques (1976), the problem is not inherent in bureaucracy, but in our implementation of it, resulting in overly vertical organizational hierarchies.

Systems engineering is an integral part of Program Management. PMs constantly consider and balance multiple concerns and influences important to program success. As a systems manager, the PM continually trades off cost, schedule, and performance (and operability) against one another and assesses alternative risks. Unfortunately, some factors are, at least

partially, outside the PM's direct control. An across-the-board budget cut jeopardizes success even if a program is proceeding as planned or higher authority shortens the planned schedule and increases the risk.¹⁰ A state-of-the-art research and development program's performance may not meet expectations¹¹ or COTS items may not demonstrate advertised abilities. Schedule risks in using Government Furnished Equipment, Information, Software, or Materials may jeopardize the program. NMCI (with a multi-billion dollar contract) may avoid difficulties experienced now that DoD is not IT's prime customer; most PMs lack such clout.

Twenty years ago a Navy PM asked contractors and sub-contractors to deliver earlier than scheduled for his Air Anti-Submarine Warfare project.¹² Almost all responded favorably. PMs might be wary of counting on such patriotic cooperation today from COTS vendors. Civilian employees expected job security — but now face A-76, the Base Realignment and Closure Act (BRAC), outsourcing, and a declining workforce. The "Workforce 2000" prediction has come to pass in the declining cadre of aging civilians leaving and eligible to retire in 5–10 years, removing megabucks worth of irreplaceable intellectual capital. All the IT tools in the world cannot replace lost tacit knowledge once it's gone.¹³ Illustratively, a retiree, fishing in Florida, received a frantic call from a former office to fly back and fix a broken legacy system that no one else could fix. After some convincing, he returned, diagnosed the problem, fixed it with a \$1 part, and left. The financial department, blanching at the \$50,000 bill he provided, insisted he itemize it. He

wrote back: replacement part=\$1, knowing where to put it=\$49,999, total=\$50,000 — and they paid him.

While performance requirements have not eased, more diverse Military activities (peacekeeping, anti-terrorism, Information Warfare) require new tactics, equipment, training, and provide new challenges. PMs now combine COTS with reused legacy systems and software, yet they must create world-class systems to avoid public aversion to military losses and resulting publicity. PMs face sufficient challenges today, even without considering politically sensitive aspects. KM is definitely not a panacea, but it does promise to leverage existing assets to alleviate some current PM problems.

Stovepipes are one of KM's shibboleths whose stereotypical source is the PMO. PMs focus on program outcomes, success, and contribution to Defense. But they report to SYSCOMs or PEOs who look across programs to cross-pollinate or integrate them.¹⁴ Indeed, program (requirements) sponsors and resource (funding) sponsors can also affect cross-fertilization of efforts within their domains. Frequently, one person or office performs both functions. Milestone Decision Authorities and Service leaders can also direct or encourage exchanges across programs. But, similar to informal knowledge exchanges, such efforts are inconsistently orchestrated. KM's value lies not in its innovative revelations but in its concerted efforts to institutionalize knowledge into both the formal organization and its informal culture.

How can KM help the PM with AM? Acquisition Reform (AR) efforts have for cross-pollination via Integrated Product

Teams (IPTs); CoPs are their KM analog. In a pair of star networks, the first one (AR) would have the IPT in the center with connections to the various PM related disciplines; it is multi-disciplined for a united purpose (clumped in KM terms). The second one (CoP) would have each Technical Discipline Leader or representative (member of the IPT) connected to its supporting CoP (clustered in KM terms).¹⁵ Thus, you would have a "star" chart (see Figure 1) — a clumping of clusters.¹⁶ If all the planets in a solar system had moons, the moons would be the people, each planet would be a discipline or cluster, and the sun or star would be the IPT or clump — for a particular program. Each discipline or cluster could employ CoP principles to create, share, store, and reuse its special knowledge, both tacit and explicit. This is a typical Social Network

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Analysis type of chart except that it is prescriptive rather than descriptive, proactive rather than passive.¹⁷

Similarly, the PMs would/could/should form a CoP at least within their parent organization if not across their Service. Thus, in the Navy, the PMs could share stories, experiences, lessons learned, best practices, etc. across, for instance, the Naval Sea Systems Command and could also connect with its counterparts (e.g., Naval Air Systems Command, see Endnote 4). More attention to Balanced Scorecard arenas (e.g., Personnel Management) could provide great potential payoffs for

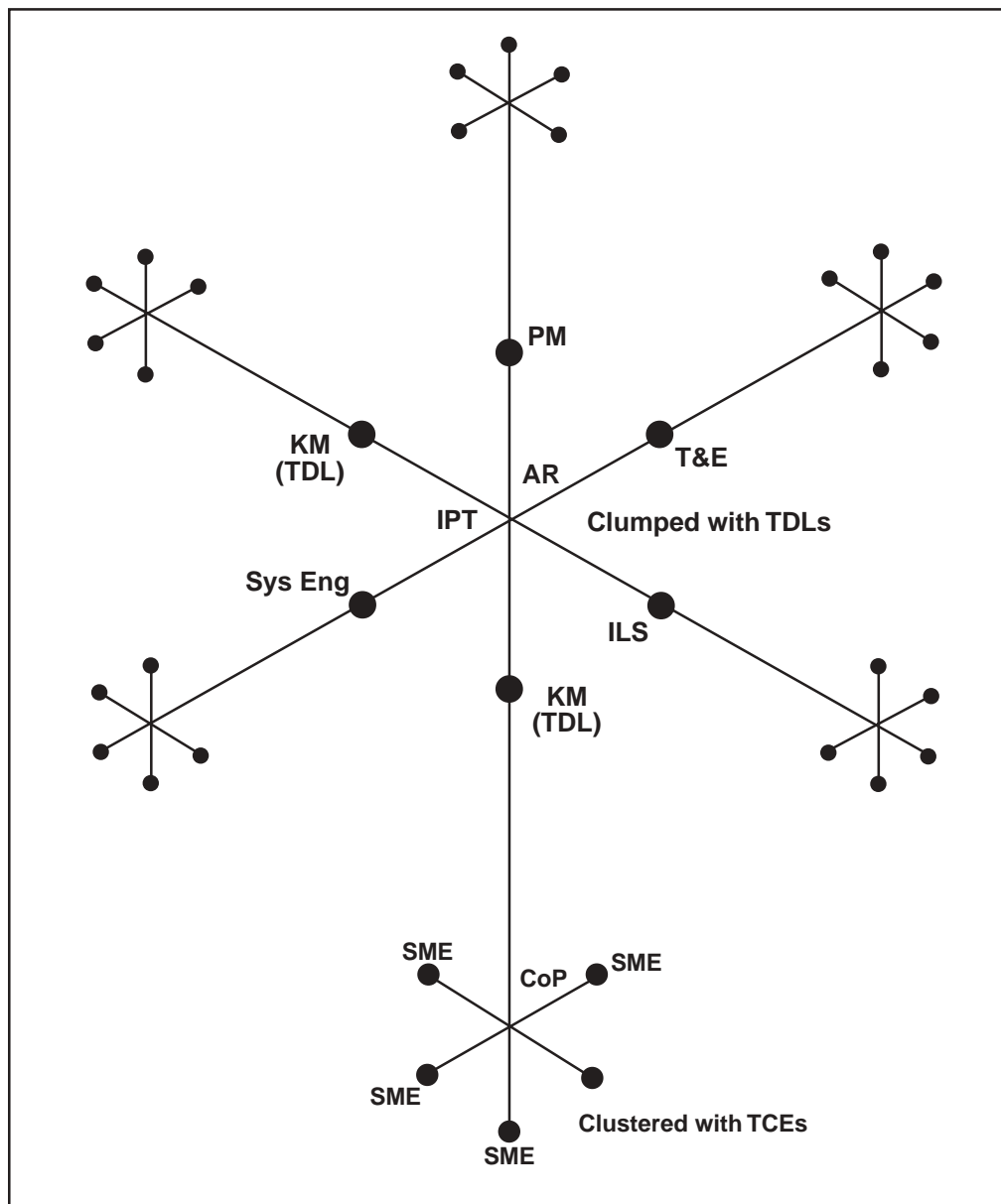


Figure 1. Meta-Networks

PM and SYSCOM/PEO. Effective tools are legally available but largely unused (e.g., instant cash awards, compensatory leave awards, and retention bonuses). The use of COTS versus MIL-Specs has increased similarities and decreased

differences among Commands. PM challenges are widely shared; it is appropriate that DoD AR presentations now include KM.

Some people and documents promote increased risk taking in DoD acquisition,¹⁸

but few have been successful in implementing it. KNetS and CoPs serve as safety nets for members.¹⁸ CoPs support innovation, initiative, and risk taking based upon peer support. They help capture the elusive butterfly of creativity and adaptability required in our fast-paced world of electronic knowledge and communications. Social networks retain shared cultural knowledge and percolate it through the enterprise; however, such a network of networks (meta-network) requires management support. Of course, resource and program sponsors can also have CoPs that interact with PM personnel through the various levels of IPTs.²⁰

CoPs own their KBs so maintenance and expansion are inherent in the process — promoting member buy-in. KBs can include videos of members sharing reusable knowledge, enabling DAWIA cross-training, and increasing knowledge transfer across functional boundaries. As a newly assigned Naval Air Systems Command (NAVAIR) PMO electronics engineer, I took a course in Research & Development (R&D) Contracting. Shortly thereafter, I visited the NAVAIR contracting office and discovered that a classmate from the course had just transferred there. All the contracting personnel were very responsive to my interest in contracting — we got along famously. Common interest, respect for someone else's specialty, and personal interaction can greatly facilitate effective working relationships. CoP membership can result in rewarding human relationships and sharing opportunities.

Like Intelligence Background Signature Survey (IBSS) and E-Net, CoPs can have their own Web sites²¹ with middleware invisibly connecting to repositories of tools, processes, techniques, knowledge, trusted

information, and authoritative data sources. Site can have tools for group-sharing, electronic brainstorming, anonymous voting, controlled threaded discussions, Web casting, expertise yellow pages, but must maintain shared problem and solution areas. CoPs can also utilize video teleconferencing (VTC) to connect their members. CIO magazine reported on a Business-to-Business procurement. Following bid submission, the procuring company faced a problem appropriate for the contract (had it already been awarded) with a solution turnaround time of two weeks. They sent it to the bidders. One bidder placed the problem on their intranet bulletin board; an engineer submitted a solution in an hour. They e-mailed it to the procuring company who liked it, but liked the incredible turnaround time even more. So they cancelled the solicitation and awarded the contract to the answering company. "Time is money," and sometimes "timing is everything."

Another way to save time (and money) is to use Artificial Intelligence wisely. Case Based Reasoning (CBR) tools combine the best features of other AI tool sets so that it

...has become the most common technology for problem resolution in the customer support environment. CBR provides a method for representing past situations ("cases") and retrieving similar cases when a new problem is input...past problems and their solutions are stored as cases. Given a description of a current problem, the system searches for similar known cases...The system then asks the user questions (proactively) about the problem to

help narrow the search for the correct solution. Problems not in the case-base represent opportunities to improve the knowledge repository. Technical experts solve these problems and input their resolutions into the case-base. While CBR has evolved from the research community, it has resulted in numerous business successes in customer support and won several innovative applications awards. In fact, CBR is probably the form of “artificial intelligence” software that is in broadest commercial use today. (Davenport & Klahr, 1998, p. 202)

The AI Branch of the Naval Research Laboratory (NRL) assisted Port Hueneme, CA, to significantly decrease the frequency of sending experts out on ships by providing CBR to ships (Aha, 1992). David Aha developed an embedded CBR tool helping users locate items on the extensively populated *KCO CD* (version 2.0). Similar to the International Agree-

“Factors describing inputs to decision processes include: timing, appropriateness, quality, and quantity.”

ments Generation (IAG) described above, NRL designed tools for automating document generation that the fleet uses for

operational planning and execution. Such a tool has vast potential to ease PM’s paper chase. PMO personnel rarely generate documents from scratch — often re-using the last approved one (of type) as basis for the new one. This approach does not

create an easily tailored, optimally effective, document. While a document must be cohesive, combining paragraphs from various prior projects may yield a superior document. Some teams pick and choose the best, appropriate sections from multiple prior documents.²² This is time-consuming. Creating CBR solutions for document types (e.g., Test and Evaluation Master Plan) is not cost effective for a PM, but is cost effective across the enterprise. The IAG is a case in point. A CBR satisfying Clinger-Cohen Act (CCA) section 8102²³ would greatly assist many PMs; if certified (like the IAG) it could greatly hasten approval, easing the PM burden. Why reinvent the wheel when you can reinvent the government? CBRs, however, require initializing/tailoring and expert KB editing/reviewing — cases must be entered in an accepted form—though emerging automated case generators may allow non-experts to create new cases, though quality may be challenging (see Footnote 23). Amalgamating with neural networks might automate loading or initializing of AI systems, making them more self-sufficient by requiring less human intervention, cost, and time.

Similarly, content analysis can potentially reduce the amount of reading matter, easing the information saturation burden of PM personnel. R&D funding could accelerate the development of such tools — which should qualify as dual-use technology. Increasing time demands on decreasing numbers of workers necessitate prioritization of content condensation. Activation Theory demonstrates (with extensive experiments in advertising and marketing) that individual performance is normally distributed with respect to stimulation. People at rest increase productivity

when stimulated; but beyond a person-specific optimal level of stimulation (local maximum), productivity falls. People become saturated, over-stimulated (Pollock, 2000; Duffy, 1962). Factors describing inputs to decision processes include: timing, appropriateness, quality, and quantity. Electronic communications (e.g., e-mail) have greatly reduced the transmission time, but simultaneously increased quantity. AI can reduce the quantity by condensing data into information and knowledge. A hybrid AI input process may improve appropriateness, but quality may be sacrificed. The KID continuum parallels management hierarchy (e.g., executives working at the “50,000 foot level” may “lose” important details) (Jaques, 1991). This parallels the Earned Value Method²⁴ and Work Breakdown Structure level hierarchy whereby a problem is investigated by drilling down from upper levels to locate its cause. For explicit information, this also parallels On-Line Analytical Processing and data mining.

Complex data mining or data exploration²⁵ is more tacit. In data exploration, one looks for non-obvious, unknown relationships in a data set. The discovery that customers frequently buy beer and diapers together from convenience stores was not intuitively obvious. But, stores increased sales by collocating the two items. Data mining/exploration parallel explicit/tacit knowledge. Data exploration extracts electronic tacit knowledge from data warehouses. Eliciting tacit knowledge from workers entails knowledge exploration — guided attempts to explore minds. Unlike miners, explorers have less knowledge of where they are going and how to get there. Mining for best practices or lessons-learned does not create world-class leadership.

Process improvement is beneficial, but it’s not re-engineering. As workers reach the age of “generativity,” usually 40–60 years of age (Levinson, 1978) however, they become motivated to share experience and knowledge; some publish articles in technical journals.²⁶ Such authors perform self-analyses, a form of self-exploration (teachers say they learn by teaching), and the articles serve as important components of informal training for readers.

Formal training is still important, providing a shared base of techniques, methods, and terminology, but it primarily addresses the explicit. The greatest organizational asset may be its tacit capital. Some companies are open to visitors, including competitors, viewing their operations. They view competitive advantage as tacit, not readily imitated by competitors. New employees learn tacit processes by immersion in company culture — on-the-job. Recent college graduates must learn real-world things before making real contributions to organizations. DoD has mentoring and shadowing on a case-by-case basis and management training programs including developmental/rotational assignments.²⁷ In Japan, companies employ “shukko” wherein a company loans employees to suppliers or vice versa. For short-term assignments, the loaning company pays the bill; for long-term ones, the two firms split the costs.

The people of each firm immerse themselves in the routines of the other, thereby gaining access to the partner’s stock of tacit knowledge. A clear benefit is that learning takes place without the need first to convert tacit knowledge to

explicit knowledge. This saves time and resources and better preserves the original knowledge base...Engineers employed by a “parent” assembler such as Toyota will work for sustained periods on the floor of a supplier in order to assist it in meeting Toyota’s stringent standards of quality and schedule of price reductions. Conversely, a supplier of key components on whom Toyota depends (such as Denso or Toshiba for automotive electronics) will locate its people at Toyota to ensure that components are designed and produced to Toyota’s specifications. (Lincoln, Ahmadjian & Mason, 1998, p. 245)

Based upon the Oversight and Review Process Action Team recommendations, the Naval Audit Service established its PEO Auditor Project (Shaffer, 1997) in which audit team leaders served two years working PM in PEOs. Participants gained immeasurable tacit knowledge of PM

“Communicating with stakeholders improves by sharing their language, culture, and tacit assumptions and views.”

processes and Navy acquisition. Shukko can also be reciprocal with organizations exchanging personnel. The author is presently loaned

from PEO-IT to DON CIO; another employee is presently loaned vice versa. The two arrangements were separate and unrelated but reflect a spirit of generalized

reciprocity, enhancing organizational cooperation and collaboration. While IPTs can improve communications among personnel from diverse DoD organizations, they do not provide shukko-like tacit knowledge transfer. Viewing major functional categories (requirements/funding, acquisition, and operations) as high-level stovepipes, KM would increase cross-circuiting insular groups. Walking a mile in another group’s moccasins and absorbing tacit know-how (vice explicit know-what) can pay big dividends — those of knowledge exploration versus mining.

Know-how embraces the ability to put know-what into practice...know-how is critical in making knowledge actionable and operational. A valuable manager, for example, is not simply one who knows in the abstract how to act in certain circumstances, but who in practice can recognize the circumstances and acts appropriately when they come along. That disposition only reveals itself when those circumstances occur. Such dispositional knowledge is not only revealed in practice. It is also created out of practice. That is, know-how is to a great extent the product of experience and the tacit insights experience provides. (Brown & Duguid, 1998, p. 94)

Communicating with stakeholders improves by sharing their language, culture, and tacit assumptions and views. Nothing excels saying, “I used to worked there, too.” Having a fixed desk site pales before having a fixed mind site — “where you stand depends on where you sit.” Having had many different seats lets one take many different stands — and understand a lot of different standpoints.

FINAL OBSERVATIONS

Knowledge Management well suits the Acquisition Professional Corps — a natural partner to DAWIA requirements. KM can add implicit and tacit knowledge to DAWIA training's explicit knowledge, completing and balancing the mix. Competence depends on learning through training and experience (among other factors).²⁸ In a climate of rapid environmental and technological change, declining resources and workforce, and increasing

realization of the value of human/intellectual capital, KM can assist AM and PMs to agilely respond to new challenges and alleviate the impact of unavoidable changes. Both top-down leadership support and bottom-up groundswell are necessary for KM to fulfill its potential contribution. PMs need cognizance of available opportunities and the determination and commitment to effectively exploit them. KM personnel can assist, but only PMs, SYSCOMs, and PEOs can put it on the line.



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ENDNOTES

1. For example, Executive Leadership Development Program & Defense Leadership and Management Program.
2. In a push mode, a system (e.g., a Web site) broadcasts changes or announcements to subscribers; in a pull mode, such items are made available on the site for users to pull (download) required broadcasts. The difference lies in whose responsibility it is to initiate the transmission.
3. As predicted by the Hudson Commission in their *Workforce 2000* report, the USG is experiencing a loss of qualified personnel (corporate knowledge). Many DON Commands, such as the Naval Facilities Engineering Command for instance, have large cadres of experienced employees who are or will be eligible to retire within five years or so. The Base Realignment and Closure Act, Office of Management and Budget circular A-76, and acquisition reform outsourcing efforts exacerbated this situation. These initiatives eliminated considerable infrastructure and overhead, but also accentuated the loss of seasoned Government personnel. The Space and Naval Warfare Systems Command, relocated from Virginia to California, retained only 30 percent of its personnel.
4. ASN (AR) and DAU together initiated the Program Managers' CoP (PMCoP) to address contracting and program management issues: www.pmcop.dau.mil
5. As predicted by the Hudson Commission in *Workforce 2000*.
6. Several Commands have initiatives in this area including the Naval Facilities Engineering Command.
7. Contracting, finance, and logistics intern programs, as well as the Presidential Management Interns (PMIs).
8. Therefore, interrelationships/interdependencies must be considered in document generation.
9. Personal conversation with the author, August 2001.
10. Per the Multifunctional Information Distribution System (MIDS) — resulting in a Blue Ribbon Panel.
11. The Vertical Line Array DIFAR II (improvement program) was cancelled for this reason.
12. PMA 264 on the Advanced Signal Processor, AN/UYS-1 program.

13. While other aspects of intellectual capital (e.g., creativity) are also lost, new hires can, presumably, replace such factors. Tacit knowledge cannot easily be replaced and is less easily measured.
14. In the U.S. Navy (USN).
15. A la NAVFAC's "E-Net" (Engineering Network) system or method.
16. Due to space limitations, only a few clusters (CoPs) are shown.
17. A number of vendors sell products that analyze user's e-mail, Web, or other electronic product usage to automate the creation of knowledge networks within an organization.
18. DoD 5000 series documents, for instance.
19. The members of the KMCoP, for instance, help each other with KM projects. For example, the author recently updated the Knowledge Centric Organization tool kit CD with considerable assistance from KMCoP members. Also, Bob Turner (of the FAA on assignment at DON CIO) created the new Cport CD with similar KMCoP assistance.
20. Overarching, integrating, and working-level IPTs function at different levels of abstraction.
21. Or space within a shared Web site portal such as the Washington Navy Yard KM site on the KMCoP site.
22. One team received a maximum Special Act Award for creating an innovative Omnibus Contract for PEO-SCS.
23. DoD Authorization Act Section 8121 (FY 2000) or Section 8102 (FY 2001) requires CIO certification of CCA compliance for IT programs.
24. EVM, formerly Cost/Schedule Control Systems Criteria, C/SCSC.
25. Bill Inmon, the father of data warehousing, calls it data exploration; it can also be called data mining.
26. See the author's prior approach to sharing knowledge: Pollock, N. (1991, Summer). Lessons Learned: International Cooperative Development Programs. *Acquisition Review Quarterly*, 217–250.
27. Long-term training programs such as the Defense Leadership and Management Program (DLAMP), Executive Leadership Course (ELC), and the Senior Executive Leadership Course (SELC).
28. Competence depends on nature, nurture, and other factors described in Ken Blanchard's *Situational Leadership II*.

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